

APPLICATION
FOR
UNITED STATES LETTERS PATENT

TITLE: SHOE OUTSOLE
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SHOE OUTSOLE

BACKGROUND OF THE INVENTION

5 The invention relates to a shoe outsole, and, in particular, to a shoe outsole for a baby shoe.

Shoe outsoles generally have grooves in their lower surface to provide flexibility. In addition, lugs or inserts may protrude from the lower surface to provide traction.

SUMMARY OF THE INVENTION

10 According to the invention, a shoe outsole includes an outer member with an inner heel region. An inner member is located in the inner heel region and includes a ground-contacting surface. The inner member has a softer durometer than the outer member.

Embodiments of this aspect of the invention may include one or more of the following features. The inner member contains a liquid or gas. The inner member extends to within about 2 mm of a back edge of the shoe outsole. The outer member includes an intermediate region. An intermediate member is located in the intermediate region and has a softer durometer than the outer member. The intermediate member extends to within about 1.5 mm of a front edge of the shoe outsole and within about 2 mm of a back edge of the shoe outsole. The outer member includes a back wall having a rounded contour extending smoothly between a horizontal plane and a vertical plane.

20 According to another aspect of the invention, a shoe outsole includes a member having a lower forefoot region and an opposite, upper forefoot region. A plurality of grooves are defined in both the lower forefoot region and the upper forefoot region.

Embodiments of this aspect of the invention may include one or more of the following features. The grooves in the lower forefoot region are substantially parallel, and the grooves in the upper forefoot region are substantially parallel. The grooves in the lower forefoot region have a depth of about 2 mm, and the grooves in the upper forefoot region have a depth of about 1 mm. The grooves in the lower forefoot region and in the upper forefoot region are generally transverse, e.g., substantially perpendicular, to a longitudinal axis of the shoe outsole. At least some of the grooves in the lower forefoot region extend to both side edges of the shoe outsole. The grooves in the lower forefoot region extend to within about 1.5 mm of a front edge of the shoe outsole, beyond a ground-engaging portion of the lower forefoot region when flatfooted. The lower forefoot region includes a plurality

of ridges. At least some of the ridges are interdigitated with the grooves in the lower forefoot region. The member includes a back wall having a rounded contour extending smoothly between a horizontal plane and a vertical plane. The member includes an inner heel region. An inner member is located in the inner heel region and has a softer durometer than the member.

According to another aspect of the invention, a shoe outsole includes a member having a ground-contacting surface including a toe region. A plurality of grooves are defined in the toe region. At least one of the grooves extends toward a front edge of the shoe outsole beyond a ground-engaging portion of the toe region when flatfooted.

Embodiments of this aspect of the invention may include one or more of the following features. The grooves have a depth of about 2 mm, extend to within about 3 mm of the front edge of the shoe outsole, and extend toward side edges of the shoe outsole. The grooves are substantially parallel to each other and are generally transverse, e.g., substantially perpendicular, to a longitudinal axis of the shoe outsole. The member includes a back wall having a rounded contour extending smoothly between a horizontal plane and a vertical plane. The member includes an inner heel region. An inner member is located in the inner heel region and has a softer durometer than the member.

According to another aspect of the invention, a shoe outsole includes a member including a forefoot region. A plurality of substantially parallel grooves and a plurality of substantially parallel ridges are located in the forefoot region. At least some of the ridges are interdigitated with the grooves.

Embodiments of this aspect of the invention may include one or more of the following features. The ridges are located at ground contacting regions of the forefoot region. The grooves and the ridges are substantially parallel to each other. The grooves have a depth of about 2 mm and are generally transverse, e.g., substantially perpendicular, to the longitudinal axis of the shoe outsole. The ridges have a depth of about 1 mm and are generally transverse, e.g., substantially perpendicular, to the longitudinal axis of the shoe outsole. The member includes an inner heel region. An inner member is located in the inner heel region and has a softer durometer than the member. The member includes a back wall having a rounded contour extending smoothly between a horizontal plane and a vertical plane.

According to another aspect of the invention, a shoe outsole includes a member having a ground contacting surface, an upper surface, and a sidewall joining the ground contacting surface and the upper surface. The sidewall includes a back wall having a rounded contour extending smoothly between a horizontal plane and a vertical plane.

The ridges and grooves in the upper and lower surfaces of the outsole as well as the rounded back wall in the heel region mimic a baby's natural walking motion during the months of the baby's first steps.

Other features and advantages will be apparent from the following description and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side view of a left shoe with an outsole according to the invention.

Fig. 2 shows an upper surface of the outsole of Fig. 1.

Fig. 3 shows a lower surface of the outsole of Fig. 1.

Fig. 4 is a cross-sectional side view of the outsole of Fig. 1.

Fig. 5 shows an upper surface of an outsole according to another embodiment of the invention.

Fig. 6 shows a lower surface of the outsole of Fig. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, a shoe 10 includes an upper 12 and an outsole 18. Upper 12 is made from, e.g., leather, canvas, or other suitable material; outsole 18 is made from, e.g., a rubber such as a thermo-plastic resin. Outsole 18 has an upper surface 20, a lower surface 22, and a sidewall 66. The outsole 18 dimensions given below are for a typical child's shoe (US size 5) having an overall length of about 146 mm and an overall width of about 68 mm.

Referring to Figs. 2 and 4, outsole 18 has a thickness, T, of about 4.5mm. Upper surface 20 of outsole 18 includes an upper forefoot region 24, generally corresponding to the area of the wearer's foot from the ball of the foot to the ends of the toes. Upper surface 20 defines a plurality of grooves 26 in upper forefoot region 24 to provide flexibility. Each groove 26 has a width, W_1 , of about 2.5 mm, and a depth, D_1 , (see Fig. 4) of about 1 mm. Grooves 26 are substantially parallel to each other and generally perpendicular to a longitudinal axis, A, of outsole 18. Grooves 26 are spaced about 5 mm from each other. Outsole 18 has front and back edges 32, 33, respectively, and left and right side edges 28, 30, respectively. Each groove 26 has a length, L_1 , of about 44 mm and extends between side

edges 28, 30, e.g., within about 3 mm of side edges 28, 30. The forward edge 27 of the most forward groove 26' is within a distance, d_3 , of about 10 mm from front edge 32. Although five grooves 26 are shown, there may be more or less grooves 26 depending on the size of the shoe.

Upper surface 20 also includes an upper backfoot region 37, generally corresponding to the areas of the arch and heel of a foot. Upper backfoot region 37 defines a plurality of depressions 35 to decrease the weight of the outsole 18. Each depression 35 has a length, L_2 , of about 12 mm, a width, W_2 , in the range of about 5 mm to 12 mm, and a depth, D_2 , (see Fig. 4) of about 1 mm to 4 mm.

Referring to Fig. 3, lower surface 22 of outsole 18 has a ground contacting surface 46, and contoured arch regions 63 which are spaced from the ground when walking. Ground contacting surface 46 of lower surface 22 includes an intermediate member 62 and an outer member 64. Outer member 64 extends to front edge 32, back edge 33, and side edges 28, 30. Intermediate member 62 extends to within a distance, d_1 , of front edge 32 of about 1.5 mm, within a distance, d_2 , of back edge 33 of about 2 mm, and generally follows the contour of lower surface 22. Intermediate member 62 preferably has a lower (softer) durometer than outer member 64.

Lower surface 22 of outsole 18 includes a lower forefoot region 34, generally corresponding to the area of the foot from the ball of the foot to the ends of the toes. Lower surface 22 defines a plurality of grooves 36 located in lower forefoot region 34 to provide flexibility. Each groove 36 has a width, W_3 , of about 2.5 mm and a depth, D_3 , (see Fig. 4) of about 2 mm. Grooves 36 are substantially parallel to each other and perpendicular to longitudinal axis A of outsole 18. Grooves 36 are spaced, e.g., about 6 mm from each other. The length, L_3 , of each groove 36 is in the range of about 50 mm to 67 mm. Each groove 36 extends towards side edges 28, 30, e.g., within about 10 mm of side edges 28, 30. At least one of grooves 36 extends completely to side edges 28, 30 (see Fig. 1, where three grooves 36 are shown extending completely to the side edges for increased flexibility). The forward edge 39 of the most forward groove 36' is within a distance, d_4 , of about 5 mm from front edge 32. Although eight grooves 36 are shown in lower forefoot region 34, there may be more or less grooves 36 depending on the size of the shoe.

Lower forefoot region 34 includes a toe region 50. At least some of the grooves 36 extend into toe region 50. Toe region 50 extends to front edge 32 of lower surface 22 beyond

a ground-engaging portion 54 (see Fig. 4) of lower forefoot region 34 when flatfooted. Grooves 36 in toe region 50 facilitate flexibility.

22.13' b1 Lower surface 22 includes a heel region 56 that defines additional grooves 37. Grooves 37 in heel region 56 extend completely to side edges 28, 30. Although six grooves 37 are shown in heel region 56, there may be more or less grooves 37, or no grooves 37.

Interdigitated with grooves 36 in lower forefoot region 34 are ridges 44 which facilitate propulsion during walking. Each ridge 44 protrudes a distance, D_4 , (see Fig. 4) of about 2 mm from surface 22. Ridges 44 are substantially parallel to each other and to grooves 36. Each ridge 44 extends towards side edges 28, 30, e.g., within about 10 mm of side edges 28, 30. The most forward ridge 44 is within about 8 mm of front edge 32. Lower surface 22 also defines a midfoot region 53 including ridges 45 for gripping the ground. Although twenty ridges 44 and 45 are shown, there may be more or less ridges 44 or 45 depending on the size of the shoe. Ridges 44 and 45 are located on outsole 18 in areas generally corresponding to regions of the child's foot most in contact with the ground during walking.

Heel region 56 defines a pocket 52 containing an inner heel member 58. Inner heel member 58 is formed from, e.g., a rubber having a lower (softer) durometer than the remainder of heel region 56, and preferably lower than the remainder of outsole 18. Alternatively, inner heel member 58 can be a bladder filled with a liquid or gas. Inner heel member 58 provides a cushion for the heel of the foot while walking.

Referring to Fig. 4, sidewall 66 of outsole 18 includes a back wall 68 that extends smoothly between a horizontal plane and a vertical plane. Having back wall 68 curved in the horizontal and vertical planes facilitates balance while walking during heel strike.

In another embodiment of the invention, shown in Figs. 5 and 6, an outsole 72 is configured particularly for outdoor use in inclement weather. Outsole 72 has an upper surface 70 with an upper forefoot region 74 and an upper backfoot region 76. Upper surface 70 defines a plurality of grooves 78, here four grooves being shown, in upper forefoot region 74, and a plurality of depressions 80 in upper backfoot region 76. Grooves 78 have a depth, e.g., of about 1.5 mm. As shown in Fig. 6, outsole 72 has a lower surface 82 with a heel region 84 defining a pocket 86 containing an inner heel member 88. Inner heel member 88 corresponds substantially to inner heel member 58 described above, though in this embodiment inner heel member 88 extends to a back edge 90 of outsole 72. Lower surface

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